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# PERIODICAL CICADAS



"17—YEAR  
LOCUSTS"

# PERIODICAL CICADAS

No other insect in North America excites as much curiosity and wonder as do periodical cicadas when they make their sudden, springtime appearance at intervals of 17 or 13 years.

After years of living in underground tunnels, millions of cicadas issue from the earth as if by a predetermined signal, undergo startling transformations, and spread through nearby trees and bushes. From morning till night they fill the air with their weird, droning song. In a few weeks, after mating and laying eggs, they die.

Periodical cicadas, commonly called 17-year locusts, are widely distributed over the eastern half of the United States, and occur nowhere else in the world.

The adult insect is about  $1\frac{5}{8}$  inches long. Most of its body is black. The legs are reddish, some of the veins in the nearly transparent wings are orange, and the eyes are red.

What was first thought to be a single species, *Magicicada septendecim*, has been found to be six closely related species. Three of these species, *M. septendecim*, *M. cassini*, and *M. septendecula*, form any 17-year brood emerging; the other three, *M. tredecim*, *M. tredecassini*, and *M. tredecula*, form any 13-year brood. A brood includes all cicadas from either the 17-year species or the 13-year species that will emerge in any one year. The 17-year species generally occur in the Northern States and the 13-year species in the Southern States, but the habitats for all species overlap.

Periodical cicadas are closely related to common cicadas, which appear every year. The common cicadas,

called harvest flies and dog-day cicadas, appear later in the season than periodical cicadas, and adults live longer. Their whirring song, which is slightly similar to that of periodical cicadas, but has less variation in the notes, is a "lazy" sound that we associate with the languorous days of late summer.

Cicadas have a beak for piercing plant tissue and drawing sap into their bodies. They are large relatives of leafhoppers, aphids, scales, and other sucking insects.

## SOME MISCONCEPTIONS

The dramatic and bizarre elements in the life cycle of periodical cicadas have caused the insects to be regarded with curiosity and superstition.

The Indians thought their periodic appearance had an evil significance.

Early American colonists had never seen periodical cicadas. They were familiar with the Biblical story of locust plagues in Egypt, but were not sure what kind of insect the story referred to. When the cicadas appeared suddenly by the millions, some of the colonists thought a "locust plague" had been visited upon them.

This confusion between cicadas and locusts exists today; cicadas are commonly called locusts. The term "locust" is correctly applied only to certain species of grasshoppers. The migratory locust, which is one of these species, ruined crops in Egypt during Biblical times. Locusts still damage crops in that country and in many other parts of the world.

Even when periodical cicadas are not confused with some other insect, their

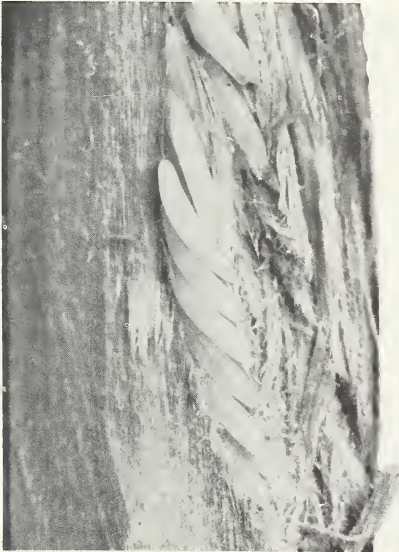
appearance in overwhelming numbers arouses fear that crops will be destroyed. But cicadas do not feed on foliage of any kind. If adults feed at all, they do so by inserting their beaks in bark and sucking juice. Although adults cause no feeding damage, adult females make injurious punctures in twigs and limbs of trees and bushes with their egg-laying apparatus.

A false belief that once was held widely is that the distinct black W toward the outer end of the front wings foretells war. The mark is characteristic of these species, and is produced by deeper pigmentation of the veins.

Cicadas cannot sting, and any story is mythical that tells of cicadas poisoning fruit by stinging it.

## HOW CICADAS DEVELOP

Using the blades of a curved, saw-like egg-laying apparatus on the end of



*Rows of eggs of a periodical cicada. (Enlarged)*



*Nymph ready for transformation.*

the abdomen, the female cicada punctures the bark of a twig and makes a pocket in the wood. In the pocket she lays 24 to 28 eggs in 2 rows. She then moves forward, cuts another pocket, and lays more eggs. She continues this process until 5 to 20 pockets have been made in the twig. The pockets are placed close together in a straight row. Sometimes they form a continuous slit 2 or 3 inches long. Moving from one twig to another, a cicada lays a total of 400 to 600 eggs.

Eggs are laid in twigs and small branches of a wide variety of trees and plants. They hatch in 6 to 7 weeks. The immature insects are called nymphs.

Newly hatched nymphs fall to the ground and burrow until they find suitable roots, from which they suck juice. This is the beginning of a 17- or 13-year period of underground existence. In wooded or forest areas, nymphs generally are 18 to 24 inches below the surface, but in apple orchards they feed 2 to 18 inches below the surface.

The nymphs are fully grown after



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*Adult nearly free from nymphal skin.*

the 7th or 8th year, but continue to feed and develop until the spring of the 17th or 13th year. They are soon to transform into adults. Several weeks before emerging from the ground, the nymphs start burrowing upward. When they have burrowed to about an inch beneath the surface, they stop and await the proper time to continue.

Under some conditions the cicada nymphs construct little cones or chimneys of earth above the surface of the soil several weeks before they emerge. These cones may protrude 2 to 3 inches above the ground and may be an inch or two in diameter. The cones are constructed by the nymph and cover the hole in which the nymph is waiting for the proper time to emerge.

If the nymphs do not construct a cone, it is common to see the hole they make a few weeks before emergence. This hole is about one-half inch in diameter and extends well below the surface of the soil. In some places in the yard, especially under trees, these holes may be quite numerous.

When the proper night comes, in April, May, or June, the nymphs leave the ground in vast numbers and head

for upright objects. A tree is the ideal goal if it can be attained. If a tree is not within range, a bush or a weed, a blade of grass or even a post or a telegraph pole will do. The nymph secures a good hold on the object, splits its nymphal skin along the middle of the back, and laboriously works itself out.

The job of shedding the nymphal skin is completed in an hour or less. The cicada is now an adult, but is soft and white. It hardens and becomes darker. In a few hours it is fully mature.

The insects mate within a week and females begin laying eggs 7 to 10 days after emergence.

Adults live 5 or 6 weeks.

Not all cicadas pass through all the stages of development. Many eggs do not hatch. Some nymphs never get established on roots, and some die while trying to shed their nymphal skins.

## WHEN THEY APPEAR

Latitude and elevation produce the conditions that determine the date on which cicadas come out of the ground. In some southern areas the period of emergence begins in the last week of April. In some northern areas it begins early in June. Between these early and late extremes, periods of emergence occur elsewhere. The farther north cicadas are, the later they emerge.

The 17- or 13-year life cycle does not mean that periodical cicadas are seen only at these intervals. The 17-year species have 17 broods and the 13-year species have 3. Most years, at least one brood of cicadas emerges somewhere. In some years, both a 17- and a 13-year brood emerge in the same general area.

While adults of one brood are singing in the trees, other broods, in different stages of development, are in the soil—perhaps close by, perhaps hundreds of miles away. They will emerge when they have passed their allotted time in the soil.

Most of the broods are separated geographically, but some overlap.

The number of cicadas emerging in successive years is not maintained at anything like an even level. Four of the 17 “possible” 17-year broods are referred to by such terms as “doubtful,” “unimportant,” and “almost extinct.” Only scattered records concern them, and one or more may be extinct. Two of the 13-year broods are large; a few others exist, but the exact number is not known.

## WHERE THEY APPEAR

The range of periodical cicadas covers nearly all the United States east of the Mississippi River, and includes Kansas, Missouri, Oklahoma, Texas, Arkansas, and Louisiana.

Most broods are limited to fairly definite areas, but some consist of small, widely scattered colonies. Moreover there are scattered colonies that seem to have little connection with large regional broods.

For convenience of reference the broods have been designated by Roman numerals. The numerals I through XVII are assigned to the 17-year broods, and XVIII through XXX to the 13-year broods. They are assigned as though a brood were to emerge each year, but, as previously mentioned, there may be gaps, especially in the 13-year broods.

Numbering of the 17-year broods

under the present system began with the 1893 brood, which was designated brood I. The 1894 brood was brood II, the 1895 brood was brood III, and so on. In 1909 brood XVII appeared, and in 1910 brood I appeared again.

The following listing shows the more important broods, the area in which each occurs, the year of the last emergence (up to 1970), and the year in which the next emergence is due.

Brood I—a small brood that occurs principally in southeastern Pennsylvania, Maryland, northeastern West Virginia, Virginia, and western North Carolina; 1961, 1978.

Brood II—occurs along the eastern seaboard from Connecticut and southeastern New York to North Carolina; 1962, 1979.



*Freshly transformed adult.*

Brood V—a compact brood that occurs in the eastern half of Ohio and throughout West Virginia except in the extreme southern part; 1965, 1982.

Brood VIII—occurs in western Pennsylvania, eastern Ohio, and the northern Panhandle of West Virginia; 1968, 1985.

Brood IX—occurs in West Virginia, western Virginia, and northwestern North Carolina; 1969, 1986.

Brood X—the largest brood; occurs in abundance over much of the northeastern quarter of the United States; 1970, 1987.

Brood XIX—occurs over much of the southern part of the United States; extends into the southern part of Illinois and to northern Missouri; 1959, 1972.

Brood XXIII—occurs in the Mississippi Valley from southern Indiana, southern Illinois, and Missouri to the Gulf of Mexico; 1963, 1976.

## THE CICADAS' SONG

A few days after periodical cicadas appear, their incessant drumming, or singing, is heard. Only the males have sound-producing apparatus, which consists of two shell-like inflated drums on the sides of the abdomen.

Two strong muscles set the drums in motion.

The chorus begins at dawn. As the temperature rises, the volume swells. Throughout the day a blanket of sound rests over the countryside. In the evening the sound ceases.

When heard from a distance the cicada chorus is a whirring, droning monotone. Actually, each of the three species that form the brood has a different note or sound. This differ-

ence in song brought about the differentiations in the six species. The loudest song is represented by the syllables "tsh-ee-EEEE-e-ou." It is sustained 15 to 20 seconds. The middle part is loud and shrill.

Another note is represented by "AH-O-oo." It has a mournful quality, and terminates abruptly in a lowered pitch. It is usually sustained about 3 seconds, and is repeated at intervals of 2 to 5 seconds.

Other notes consist of prolonged burring, which is the basic sound of the cicada, in soft, short purrs.

To begin a note, a cicada lifts its abdomen (the back part of the body) to a rigid, horizontal position. When the sound ends, the abdomen drops back to the usual, somewhat sagging position.

## DAMAGE TO TREES

Egg punctures by female cicadas can severely damage or even destroy young, transplanted trees in nurseries and orchards. Older trees also may be damaged. The female usually chooses twigs and branches up to seven-eighths inch in diameter; but, when pressed for laying surfaces, she lays in every accessible area.

Egg punctures can cause the twigs and branches of small, immature trees to wilt. The wounds can allow disease to enter and can serve as shelters and feeding location for scale insects, wooly aphids, and other insects.

Twigs in which many egg pockets are made are often broken or partly broken from the tree. Some fruit is lost from bearing trees, and the severe pruning that is necessary after the attack reduces the next season's crop and increases cost of production.



Seventy to eighty species of trees, shrubs, and herbaceous plants are used by cicadas for egg laying. Those for which females have a preference include oak, hickory, apple, peach, pear, and grape.

Severe decline of apple trees sometimes occurs in older orchards where high populations of cicadas exist. Symptoms are dying back of limbs, no new growth, and very light fruit set. These symptoms commonly are referred to as starvation symptoms. As many as 104 nymphs have been dug from a square foot of soil under affected apple trees. Complete orchards have had to be replanted or abandoned.

Serious visible feeding damage by cicadas has been recorded only for fruit plants.

## **REDUCING THE DAMAGE**

### **Control With Netting**

Small trees and shrubs may be protected by covering them with open-weave cloth, such as heavy cheesecloth, netting, tobacco shade cloth, or the cloth used to cover tobacco seedbeds in the South. The cloth should be put in place as cicadas begin to appear and should remain until, about 5 weeks later, most of them are gone.

Many growers refrain from planting orchards in a cicada year, or in the preceding year. Before postponing the planting of trees, they should consider cloth protection. The cost may be less than the loss represented by 1 or 2 years of delay in the development of a new orchard.

If little or no pruning is done to large trees the winter preceding an infestation, much of the injured wood can be pruned away the following winter.

In residential areas where cicadas have previously been abundant, it is advisable not to plant young shrubs or trees around the home the year another emergence is expected.

### **Control With Insecticides**

Carbaryl can be used on ornamental plants, shade trees, and those fruit plants that are listed on the container label. One application of carbaryl just before egg laying starts will protect 5 to 8 days, the length of time depending on the degree of infestation and the character of the surrounding area.

Cicadas migrate from wooded areas as far as one-half mile away when the oviposition urge is the greatest, and it often is advisable to treat wooded areas surrounding an orchard. Three to five applications of carbaryl are generally necessary where heavy infestations of cicadas are present throughout an area. Heavy rains reduce the protection.

Prepare a carbaryl spray by mixing 2 pounds of 50-percent wettable powder with 100 gallons of water. For 1 gallon of spray use 2 level tablespoons of 50-percent wettable powder.

## **PRECAUTION**

Pesticides used improperly can be injurious to man, animals, and plants. Follow the directions and heed all precautions on the labels.

Store pesticides in original containers under lock and key—out of the reach of children and animals—and away from food and feed.

Apply pesticides so that they do not endanger humans, livestock, crops, beneficial insects, fish, and wildlife. Do not apply pesticides when there is dan-

ger of drift, when honey bees, or other pollinating insects are visiting plants, or in ways that may contaminate water or leave illegal residues.

Avoid prolonged inhalation of pesticide sprays or dusts; wear protective clothing and equipment if specified on the container.

If your hands become contaminated with a pesticide, do not eat or drink until you have washed. In case a pesticide is swallowed or gets in the eyes, follow the first aid treatment given on the label, and get prompt medical attention. If a pesticide is spilled on your skin or clothing, remove clothing immediately and wash skin thoroughly.

Do not clean spray equipment or dump excess spray material near ponds, streams, or wells. Because it is difficult to remove all traces of herbicides from

equipment, do not use the same equipment for insecticides or fungicides that you use for herbicides.

Dispose of empty pesticide containers promptly. Have them buried at a sanitary land-fill dump, or crush and bury them in a level, isolated place.

NOTE: Some States have restrictions on the use of certain pesticides. Check your State and local regulations.

## NATURAL ENEMIES

Birds destroy many cicadas. Where cicadas are numerous and birds rather few, as in dense woods, cicadas are not materially reduced. Where the situation is reversed, as in small, open groves, or near houses, cicadas may be greatly reduced by birds.

Insects and mites attack cicada eggs, and a fungus disease kills some adults.

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*Use Pesticides Safely*  
**FOLLOW THE LABEL**  
U.S. DEPARTMENT OF AGRICULTURE

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(Cover) Adult several hours after transformation.

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